Patent 5,159,972 (hereafter Gunnerson).

Claims 9, 11, 21, 28 and 30 stand rejected under 35 USC § 103 as being obvious over Gunnerson in view of US Patent 5,917,699 (hereafter Hung) and US Patent 5,661,637 (hereafter Villaume).

Claims 17-19, 27 and 31 stand rejected under 35 USC § 103 as being obvious over Gunnerson in view of Hung.

Claims 12, 20, 29 and 32 stand rejected under 35 USC § 103 as being obvious over Gunnerson in view of Hung and further in view of US Patent 3,604,503 (hereafter Feldman).

§ 112, First Paragraph

With respect to the § 112, first paragraph rejection of claims 8-10 and the associated objections to the specification, applicant respectfully submits that applicant's disclosure is adequate to support these claims under 35 USC § 112, first paragraph.

The enablement requirement of 35 USC § 112, first paragraph requires only that the applicant disclose the invention sufficiently to enable on of skill in the art to make and use the invention. It is not necessary that patent drawings illustrate every embodiment of the invention, particularly where specification is adequate; in determining disclosure, resort must be had to specification as well as drawings; the entire instrument must be construed and not merely part of it. See, e.g., Anthony Co. v Perfection Steel Body Co. (1963, CA6 Ohio) 315 F2d 138, at 140:

> It was not necessary that the patent drawings illustrate every embodiment of the invention, particularly where the specifications are adequate as here. Chicago Pneumatic Tool Co. v. Hughes Tool Co., 97 F.2d 945 (C.A.10). In determining the disclosure, resort must be had to the specifications as well as the drawings. Minerals Separation North American Corp. v. Magma Copper Co., 280 U.S. 400, 50 S.Ct. 185, 74 L.Ed. 511; Baldwin Rubber Co. v. Paine & Williams Co., 99 F.2d 1 (C.A.6). The entire instrument must be construed and not merely part of it. 69 C.J.S. Patents, 190a.

The enablement requirement does not require that applicant re-describe every aspect or

every possible embodiment with respect to each and every figure or each and every species. One of skill in the art, considering the disclosure as a whole, can appreciate how the various considerations of one embodiment is applicable to other embodiments.

The Office Action contends that the elected species does not show the limitations claimed.

> Applicant's concerns directed toward the specification objections and 35 U.S.C. 112, first paragraph rejections are not found persuasive. The originally filed specification fails to disclose **the elected species**, as illustrated in figure 4, having the limitations of claims 8-10, 12 and 20. More specifically, the originally filed specification fails to disclose the elected species having the first thermal conductivity at least twice (claim 8) or is approximately four times (claim 9) the second thermal conductivity; the first heat dissipation mechanism is an active heat dissipation mechanism as claimed in claim 10 and the heat pipe is a single sealed tubular member which is uniformly tubular except for the limited conductivity portion as claimed in claims 12 and 20.

Office Action, p. 6 (emphasis in original). However, a detailed analysis of applicant's disclosure shows that applicant makes it very clear that the various embodiments of the limited conductivity portion (e.g., the block or the variable conductivity heat pipe) may be substituted for each other and the like considerations apply regardless of which is used. The portion shown in Figure 4 illustrates an alternative "limited conductivity portion" which may be substituted for the "limited conductivity portion" shown in Figures 1. Applicant is **not** required to show every aspect of an invention in a single figure. See 37 CFR § 1.84(h)(5), which provides for figures illustrating modified forms, 37 CFR § 1.84(h)(1) which provides for exploded views, 37 CFR § 1.84(h)(2) which provides for partial views, and 37 CFR § 1.84(h)(3) which provides for sectional views.

To the extent the Examiner would like a single figure such as figure 1 to be added to the application to include the alternative limited conductivity portion of figure 4, applicant will gladly add such figure. Clearly, applicant's specification supports the entire combination. Applicant starts applicant's detailed description indicating that the limited thermal conductivity

portion is a generic element, stating:

> Furthermore, one embodiment utilizes a limited thermal conductivity portion in a thermal path and may therefore provide separate thermal paths which have thermal conductivities proportional to the heat dissipation capacity of the different heat dissipation devices connected thereto. Such varying thermal conductance may allow a keyboard to maintain an acceptable temperature by limiting the amount of heat transferred to a heat dissipation plate beneath the keyboard.

Applicant's disclosure, p. 8, lns. 19-25. Applicant explains that the grooved block of Figure 1 is one example of such a limited conductivity portion.

> Thus, the thermal conductivity of this path may be set by adjusting the thermal conductivity of the limited conductivity portion (i.e., in this embodiment the grooved block) of the path.

Applicant's disclosure, p. 12, lns. 1-4. Then, applicant explains that figure 4 is an alternative embodiment with a different limited conductivity portion.

> In this embodiment, a throttling portion 410 of the heat pipe 400 forms the limited conductivity portion which allows a smaller amount of heat to be transferred the passive heat dissipation mechanism, the keyboard plate 440.

Applicant's disclosure, p. 14, lns. 10-13. Applicant further describes the use of the limited conductivity portion with respect to figure 4 and indicates that **this embodiment** of the limited conductivity portion may be coupled to an active heat dissipation element and a passive heat dissipation element as well as an electronic component.

> Thus the limited conductivity portion may include a throttling portion and another high thermal conductivity portion or may include an entire portion having lower thermal conductivity. In any case, the limited conductivity portion may be used to limit the flow of heat to the keyboard plate 440 to apportion heat from the processor die 205 to the active heat dissipation mechanism and the keyboard plate 440 such the heat keyboard remains at an acceptable temperature.

Applicant's disclosure, p. 14, ln. 26 – p. 15, ln. 5 (emphasis added). Moreover, this section of applicant's specification clearly indicates the substitutability across the figures by referring to the processor die 205 as referred to in embodiments of Figures 2 - 4.

With respect to the thermal conductivity rations of claims 8-9, applicant notes applicant's specification at page 15, line 22, which states "[f]or example, $\theta_1$ may be at least twice $\theta_2$." Additionally, page 13, lines 3-6 detail an embodiment in which one thermal path has

approximately four times the thermal conductivity of the other path. Furthermore, applicant notes that claims 8 and 10 are substantially similar with respect to the thermal conductivity recited when originally filed. One of skill in the art can clearly recognize that these ratios could be equally applicable to any embodiment of the limited conductivity portion (e.g., a block or a variable thermal conductivity heat pipe) because they are described as being set in proportion to the heat dissipation capacity of the respective head dissipation mechanism. The same considerations might apply to either a block or a variable thermal conductivity heat pipe.

With respect to the active heat dissipation mechanism of claim 10, applicant again notes that the above-referenced paragraph at p. 14, ln. 26 – p. 15, ln. 5 explicitly describes the inclusion of an active heat dissipation mechanism in the embodiment of Figure 4. Activation as recited in claim 10 was also supported by original claim 10, the original specification, and is also equally applicable to any of the embodiments, as would be readily recognized by one of skill in the art.

Thus, both applicant's originally filed specification and claims describe two thermal paths with the ratios described in these claims as well as other claimed details. Accordingly, applicant submits that applicant's specification and claims fully comply with 37 CFR § 1.71 and 35 USC § 112, first paragraph.

Applicant respectfully submits that applicant's disclosure, as a whole, provides adequate support under 35 USC § 112, first paragraph to enable one of skill in the art to make and use what is claimed, including all limitations, for claims 8-10, 12, 20 and 32. To the extent that the Office Action contends that 35 USC § 112, first paragraph requires more, such as re-describing every aspect of the disclosure with reference to figure 4, applicant respectfully disagrees, and it is clear that the law does not require such. It is not necessary that patent drawings illustrate every

embodiment of the invention, particularly where specification is adequate; in determining disclosure, resort must be had to specification as well as drawings; the entire instrument must be construed and not merely part of it.

To the extent the Office Action's rejection is intended to allege deficiency under the description requirement of § 112, first paragraph, applicant submits that applicant was clearly in possession of the invention at the time of filing. The description requirement requires that the applicant's description and/or claims contain statements that are as broad as applicant's current claims. See, e.g., In re Di Leone, 58 C.C.P.A. 925, 926 (CCPA 1971); Chisum on Patents § 7.04. As originally filed, applicant's original claims also clearly evidence that applicant could have used either type of limited conductivity portion in conjunction with the various other features claimed. Note that original claim 1 allowed any type of limited conductivity portion, whereas original claim 3 recite a head conductive block and claim 7 recited a variable thermal conductivity heat pipe. Therefore, applicant respectfully submits that applicant clearly meets both the enablement and description requirements of 35 USC § 112. Applicant's originally filed claims and/or specification clearly contain statements that are as broad as applicant's current claims.

Other than the description and enablement requirements, § 112, first paragraph does not impose any further requirements with respect to individual species and/or figures of the patent application.

With respect to claims 12, 20 and 32, these claims have been broadened and now omit the allegedly offending details.

Prior Art Rejections

Claims 7-8 and 10 stand rejected under 35 USC § 102(e) as being anticipated by US Patent 5,159,972 (hereafter Gunnerson). Applicant previously argued that Gunnerson did not meet the limitations of applicant's claims. The Final Office Action argues that "[t]he claims do not require the dissipating mechanisms to be physically coupled", and therefore that applicant's claims are not distinct from Gunnerson because hot air flow thermally couples Gunnerson's fan to a heat generating element.

Applicant has amended claim 7 to indicate that a physical coupling of elements is present. A physical coupling distinguishes the alleged air coupling provided in Gunnerson, but would allow indirect or direct physical coupling. For the reasons previously argued in applicant's prior response and additionally now because applicant has limited claim 7 to a physical coupling, applicant respectfully submits that claim 7 and its dependent claims are allowable. Likewise, claims 17 and 27 now recite a physical coupling.

Applicant submits that all claims now pending are in condition for allowance at least by way of dependency on an allowable independent claim. Such action is earnestly solicited at the earliest possible date. If there is a deficiency in fees, please charge our Deposit Acct. No. 02-2666.

Respectfully submitted,

Date: 6/28/02

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Conny Willesen
Name of Person Mailing Correspondence

Conny Willesen 7-8-02
Signature Date

APPENDIX A

VERSION OF CLAIMS WITH

MARKINGS TO SHOW CHANGES MADE

7. (Amended) A heat exchanger comprising

a first heat dissipation mechanism having a first heat dissipation capacity;

a second heat dissipation mechanism having a second heat dissipation capacity;

a variable thermal conductivity heat pipe having a first portion [thermally]physically coupled to a heat generating component, a second portion [thermally]physically coupled to the first heat dissipation mechanism, and a third portion separated from the first portion and the second portion by a limited conductivity portion and [thermally]physically coupled to the second heat dissipation mechanism.

12. (Amended) The heat exchanger of claim 7 wherein [said heat generating component is an integrated circuit that is coupled to the first portion of the variable thermal conductivity heat pipe, and further wherein said variable conductivity heat pipe comprises a single sealed tubular member which is uniformly tubular except for] the limited conductivity portion [which ]is a narrowed portion of the variable thermal conductivity heat pipe.

17. (Amended) A system comprising:

an electronic component;

a variable thermal conductivity heat pipe having a first portion and a second portion separated by a throttling portion, the electronic component being [thermally]physically coupled to the first portion; and

a first heat dissipation mechanism [thermally]physically coupled to the first portion of the variable thermal conductivity heat pipe; and

a second heat dissipation mechanism [thermally]physically coupled to the second portion of the variable thermal conductivity heat pipe.

20. (Amended) The system of claim 18 wherein [said variable conductivity heat pipe comprises a single sealed tubular member which is uniformly tubular except for ]the limited conductivity portion [which] is a narrowed portion of the variable thermal conductivity heat pipe.

27. (Amended) An apparatus comprising:

at least one electronic component;

a heat pipe having a limited conductivity portion, the heat pipe having a first portion [thermally]physically coupled to the at least one electronic component;

a fan based heat exchanger [thermally]physically coupled to a second portion of the heat pipe;

a metallic plate physically coupled to a third portion of the heat pipe and separated from the first portion that is connected to the at least one electronic component by the limited conductivity portion of the heat pipe.

32. (Amended) The apparatus of claim 27 wherein [said heat pipe is a uniform and sealed heat pipe except for ]the limited conductivity portion [which ]is narrowed.